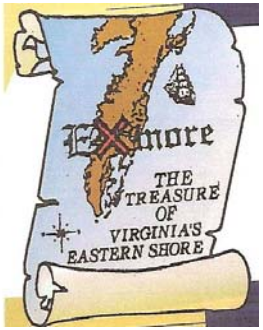
Virginia Department of
Housing and Community Development
Rural Broadband Planning Initiative

Broadband Roundtable Regional Meeting November 16, 2007

Community Broadband Telecommunications Planning Services For The Eastern Shore of Virginia

Northampton County



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Community Broadband Planning Study

Accomack County and the Towns of Chincoteague and Exmore/Nassawadox, Virginia

July 31, 2007

SPOTTS | STEVENS | McCOY
Engineers and Consultants

In Association with

Project Milestones

Project Kick-Off
#1: Needs Assessment
#2: Broadband Education Development Strategies and End-User Application Identification
#3: Last Mile Connectivity Solutions
#4: Preliminary Engineering Design and Cost Estimates
#5: Organization and Network Options
#6: Funding Strategies for Future Implementation Projects
#7: Required Process Elements (Public Hearings)
Final Report and Presentation

Project Approach

Data Collection

- ***Existing Data Collection*** (Studies, Zoning Maps, Comprehensive Plans, Infrastructure Maps, Economic Development Features, Etc.)
- ***New Data Collection*** (Hardcopy and On-line Surveys, Face-to-Face Interviews, Phone Interviews, Service Providers Meeting, Public Meetings)
- *Funnel-down Study Approach* (**GIS Mapping and Analysis**)
- ***In-Field Make Ready Assessment*** (Review existing conditions, determine quantities and costs, determine optimal route and planned facilities)
- ***Community Demographics*** (Population/Housing Density), Establishing Priorities, Estimated Penetration/Take-Rates
- ***Preliminary Cost Estimates and Engineering*** (Conceptual Network),
- ***Research of Applicable Laws*** for Organizational Structuring
- ***On-line Research*** of Funding Opportunities
- ***Business Modeling Standards***

Project Management Approach

"Funnel-Down" Study Approach To Focus on Needs and Solutions

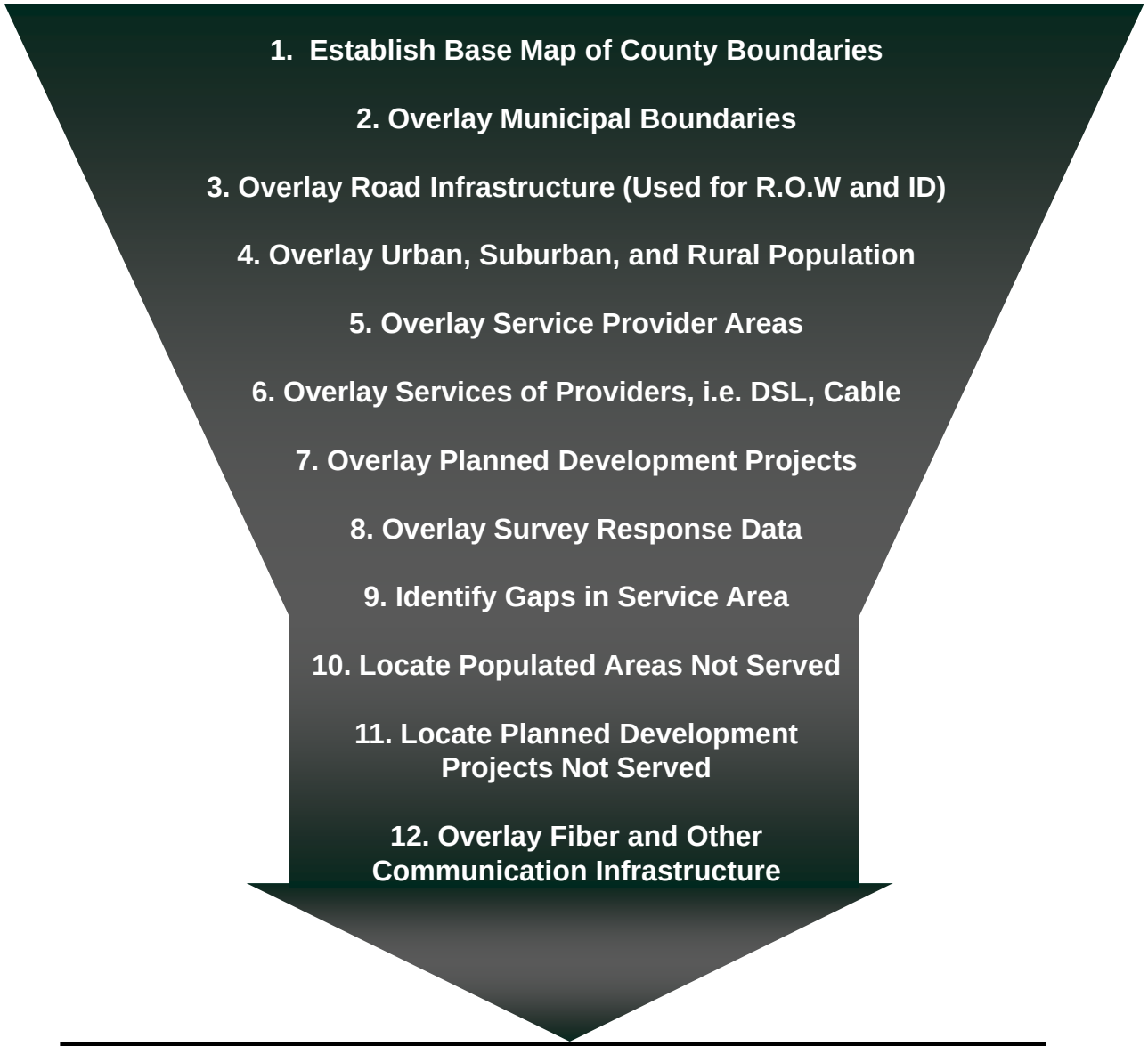
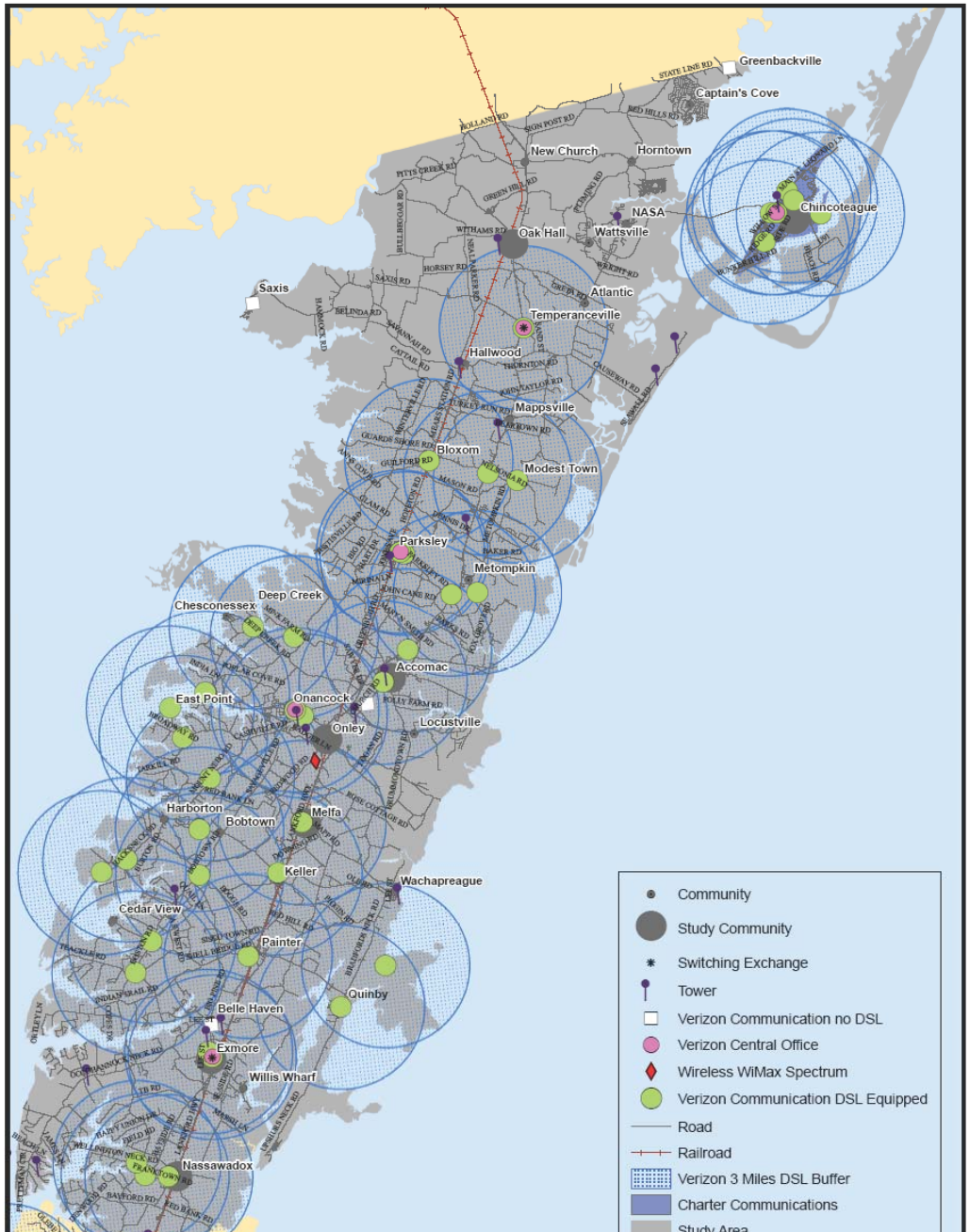


Figure ES-D: "Service Provider Features" highlights the significant amount of Central Office and Remote Cabinet DSL Equipped locations and theoretical DSL coverage areas



Service Provider Survey/Interview

- Infrastructure Maps
- Service Areas
- Services
- Pricing
- Technology Oriented Questions (i.e., Description of "Broadband")
- Interest in Public-Private Partnership
- Interest in "Open Access Networks"

Central Accomack County and the Towns of Chincoteague, Exmore and Nassawadox desire to be forward-thinking on behalf of residents, businesses, and those considering a move to the Virginia Eastern Shore. Their goal is to lead in developing economic assets for future growth on the Eastern Shore.

A critical component of economic development is state-of-the-art communication technology. High-speed (broadband) Internet access, digital television programming, and affordable options for telephone service are available today in *some* areas of the Eastern Shore. The Accomack-Northampton Planning District Commission is assisting with a study to determine what services are available in our communities and most importantly, what services our citizens desire. This study will be used to develop strategies for bringing those services to our communities.

You have been selected to participate in this study. Spotts, Stevens and McCoy (SSM), a private consulting firm, is conducting this survey as part of the communications study. They will collect these questionnaires and compile the data. Your answers are confidential and will be used in a report only as summaries in which no individual's answers can be identified. Only your street address will be used for geographical planning purposes. Your privacy will be respected. The survey should be completed by a head of the household, 18 years of age or older.

Please lend us *your voice* and take part in this study. We realize your time is valuable and sincerely appreciate your assistance. Please take a few minutes to complete this questionnaire. When finished simply drop it in any mailbox. No return postage is necessary. **Time is of the essence and we ask that you return this survey right away.** Your opinion DOES matter – improving our communities is everyone's business. Thank you for your support.

Questions? Please call the Accomack-Northampton Planning District Commission at (757) 787-1247 x115

This survey is also available online at **www.VABroadbandStudy.com**

Residential demographic data is collected for documenting statistics of the survey pool and to comply with state and federal grant guidelines. Your individual responses will not be shared.

1. Please indicate the municipality located closest to your residence.

☐ Accomac ☐ Atlantic ☐ Belle Haven
☐ Chincoteague ☐ Exmore ☐ Melfa
☐ Nassawadox ☐ Onancock ☐ Onley
☐ Tasley ☐ Wallops Island ☐ Willis Wharf

If your mailing address is a PO Box, please enter your street address for geographical locating purposes:

House # Street Address Zip Code

2. What is your age? ☐ Under 20 ☐ 20-24 ☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ 55-59 ☐ 60-64 ☐ 65 or Over

3. Do you have children living at home? ☐ Yes ☐ No *If yes, please indicate age groups:* ☐ Under 5 ☐ 5-17 ☐ 18 or Over

4. Does your household have a personal computer? ☐ Yes ☐ No

5. Which of the following best describe the type of Internet service you subscribe to at home?

☐ No Internet at home ☐ Satellite
☐ Dial up on telephone line ☐ Cellular
☐ Wireless ☐ DSL
☐ ISDN ☐ Cable Modem

6. What is the name of the company that provides your Internet connection?

_____

☐ Not Sure ☐ No Internet Access

7. How would you assess your current Internet bandwidth (speed)? ☐ Adequate ☐ Inadequate ☐ More Than Needed

8. To the best of your knowledge, how much are you currently paying per month just for Internet access? ☐ Under $20 ☐ $20-$40 ☐ $41-$60 ☐ $61-$80 ☐ More than $80

9. If you do not subscribe to an Internet service or high-speed (faster than dial-up) Internet service at home, why not?

☐ Not available in my area
☐ Too expensive
☐ Not interested in this service
☐ Using high-speed elsewhere

10. Does anyone in your household use the Internet to work from home? ☐ Yes ☐ No

11. Does anyone in your household use the Internet to complete school or job training course work?

☐ Yes, at least once per week
☐ Yes, at least once or twice per month
☐ No

12. How important is Internet access to you or your household?

☐ Very Important ☐ Somewhat Important
☐ Not Important ☐ No Opinion

13. In the past 6 months, which of the following activities have you performed online?

☐ Searched for travel related info
☐ Searched for health or medical info
☐ Purchased products or services
☐ Sold products or services
☐ Visited a news website
☐ Visited a state or local government website
☐ Searched for info related to school work
☐ Researched a major purchase
☐ Performed a financial transaction with a bank
☐ Communicated with a teacher
☐ Searched for a job
☐ Took an online course
☐ Downloaded or watched video online

14. If affordable ***wireless*** high-speed Internet access was available in your community, how likely would you be to subscribe to this method of Internet access?

☐ Very likely
☐ Somewhat likely
☐ Not likely

15. Do you subscribe to a pay TV service? ☐ Yes, cable ☐ Yes, satellite ☐ No

16. Please indicate the level of cable or satellite TV service you currently subscribe to:

☐ Minimum basic ☐ Digital service
☐ Expanded basic ☐ No pay TV service

17. To the best of your knowledge, how much are you currently paying for cable or satellite service each month? *Do not include Internet Access.*

☐ Under $20 ☐ $20-$40 ☐ $41-50
☐ $51-$75 ☐ More than $75 ☐ Not Applicable

18. Please indicate the phone service(s) you subscribe to and your total monthly expenses for each:

Regular telephone service (wired): ☐ Yes ☐ No
☐ Under $35 ☐ $35-$75 ☐ More than $75

Cell phone service: ☐ Yes ☐ No
☐ Under $35 ☐ $35-$75 ☐ More than $75

Internet phone service: ☐ Yes ☐ No
☐ No Charge ☐ Under $35 ☐ $35 or More

19. Are you satisfied with the current voice, video and Internet services available to you?

Internet: ☐ Satisfied ☐ Not Satisfied
Video: ☐ Satisfied ☐ Not Satisfied
Telephone: ☐ Satisfied ☐ Not Satisfied

Comments—Suggestions

20. What changes or improvements to communication technology on the VA Eastern Shore would best meet your needs?

_____
_____
_____
_____

Your opinion is very valuable—thank you for your time and support. Individual responses to survey questions are confidential.

TO RETURN SURVEY: Simply fold the survey flap to display the return address, tape, and drop it in the mail today. Thank you!

www.VAbroadbandstudy.com

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New Data Collection

Hardcopy and On-Line Survey

Residential + Business + Interview Public School District Officials and Higher Education Personnel, as well as Service Providers

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SSM, Inc. On Behalf of the
Accomack-Northampton Planning District Commission
Communication Assessment Survey
P.O. Box 6307
Reading, PA 19610-9774

Community Needs Assessment

- 3,000 Residential Surveys Distributed
- Business Addresses provided by the Eastern Shore Chamber of Commerce, augmented by list provided by the VA Employment Commission
- 873 Business Surveys
- Public School District Officials and Higher Education Personnel interviewed via telephone
- On-line Survey used in addition to Hardcopies
  - Demographic Data
  - Internet Usage Habits
  - Method of Access
  - Satisfaction w/Current Providers
  - Monthly Cost of Access to the Internet

Survey Response

- 10% was target, returning a statistically valid sample size at a 95% confidence level
- Actual return rate of 19% (558) residential and 23% (200) business
- Participation on-line was high w/27% of returned residential surveys and 7% of the businesses choosing to respond on-line
- Local school district and ESCC proactive in encouraging students and teachers to participate

Residential Use and Unmet Demand

Pricing

- Dial-up Internet access available to all residents at pricing as low as $9.95 per month from national providers
- Local providers such as ESVA.net, Delmarva Online, and Continental VisiNet offering dial-up access on a set number of hours or unlimited access at pricing from $16.95 to $25.00 per month
- DSL and cable modem available in areas of Accomack and Northampton counties at prices ranging from $17.99 to $51.99 per month for residential service
- Satellite via. HughesNet available to all residents and businesses on the Eastern Shore at pricing starting at $59.99 per month plus costs of equipment in hundreds of dollars
- Satellite provider Wild Blue recently begun accepting applications for new service on the Eastern Shore w/pricing for the highest speed Internet product at $79.95 per month plus costs of $299 for equipment

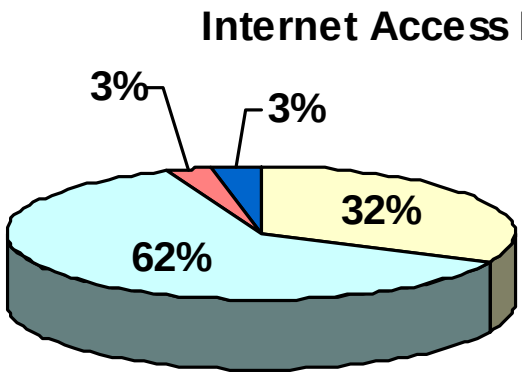
Residential Survey Demographics

- Age ranged from 20 to over 65 years old
- Over 54% represented working age adults in the 20-59 age range
- Responses from citizens aged 60 and above was high; 92% of respondents aged 60 to 64 and 73% of those aged 65 or older are actively access Internet from home
- Responses from children

Under 5	5-17	18 or older
25%	62%	22%

- Computers are in homes of 89% of respondents w/84% subscribing to Internet access
- Majority accessing faster than dial-up via DSL; 24% of DSL subscribers describe their speed as inadequate
- 75% of dial-up interested in going to a faster speed , but believes services are not available to them; 16% claim higher speed services are too expensive (Average cost fro service is $27.58 per month)

Residential Survey Responses



Cable Modem, Cellular and ISDN each represent less than 1% of Access Methods

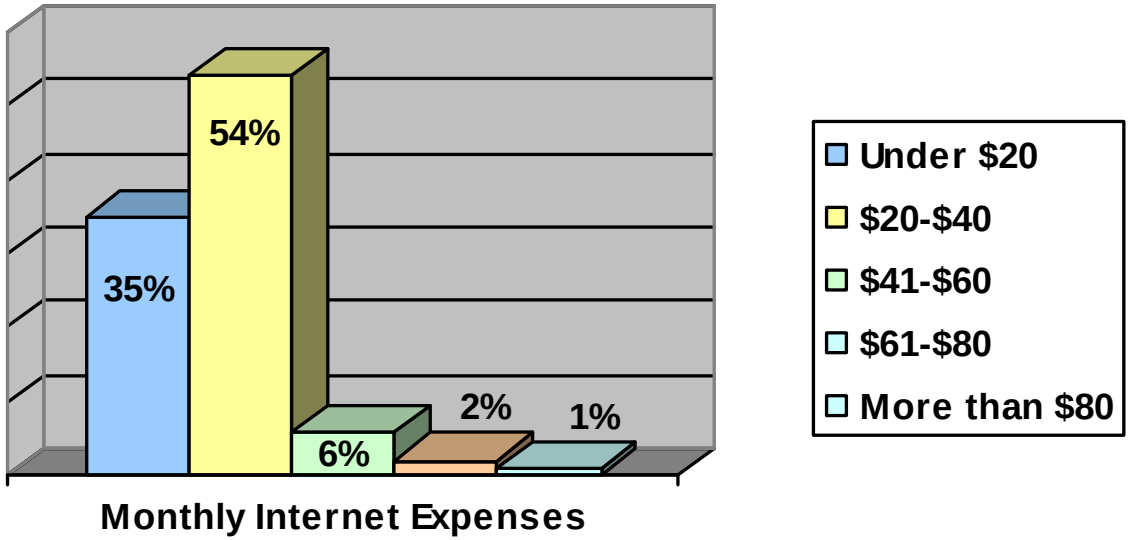
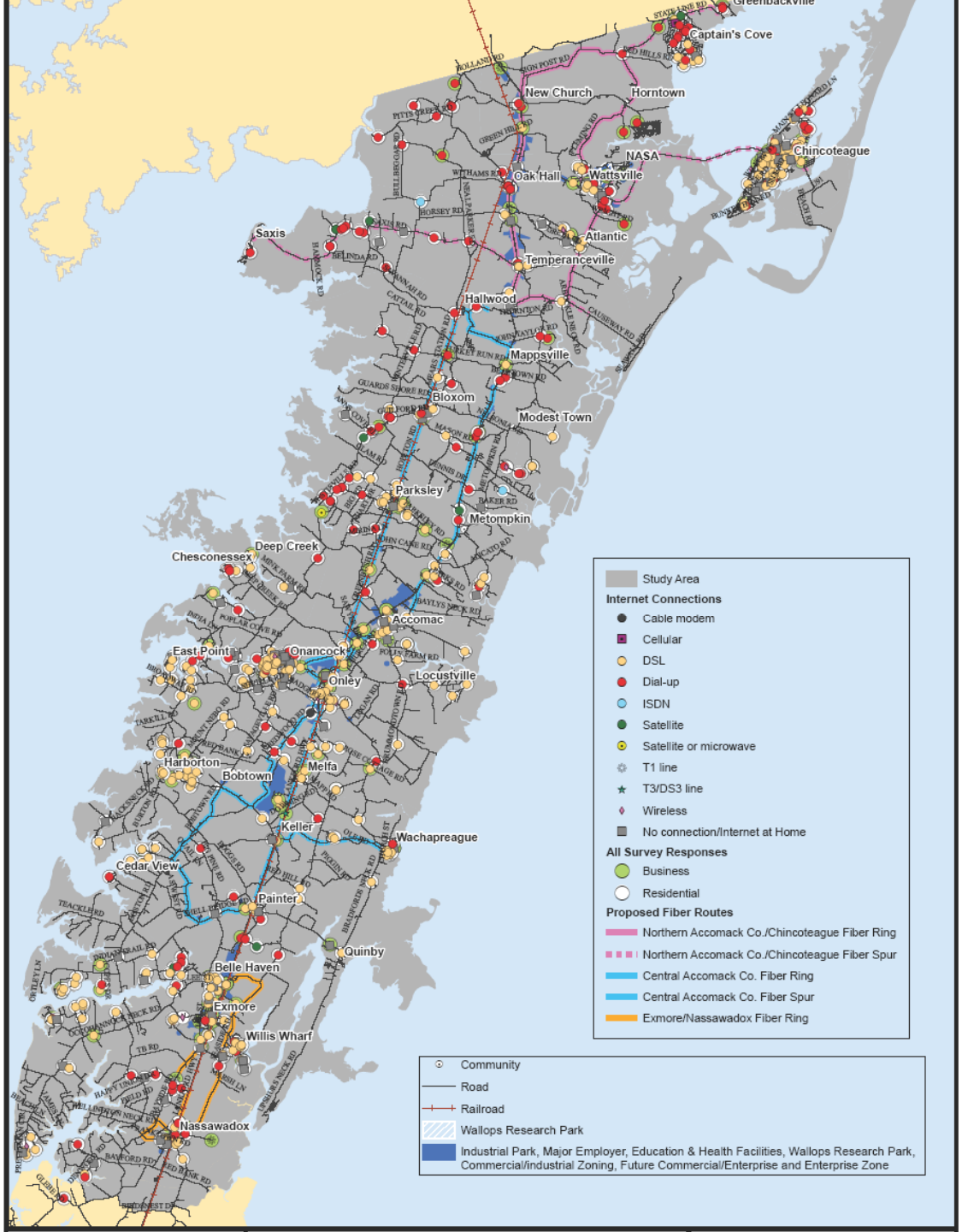


Figure 1.7.1 "Internet Connections, Survey Responses and Proposed Fiber Routes" highlights the predominate use of DSL Internet connection. The large extent of dial-up use on the Eastern Shore is also noticeable



Residential Internet Use

Residential Online Activities in the Past 6 Months	
Activity	**% of Residents**
Purchased products or services	72%
Visited a news website	72%
Searched for travel related information	69%
Searched for health or medical information	68%
Visited a state or local government website	59%
Researched a major purchase	55%
Performed a financial transaction with a bank	50%
Searched for info related to school work	33%
Downloaded or watched video online	32%
Took an online course	17%
Searched for a job	15%
Communicated with a teacher	14%
Sold products or services	10%

Large Majority of Eastern Shore Residents use the Internet for Access to News and Information

Other Residential Services

Pay TV

- While Charter Communications has a franchise agreement to serve the counties, it does not serve all households
- 88% report subscribing to a pay TV service, primarily via satellite
- % of respondents with cable TV service who also receive Internet access via cable modem is very low (believed to reflect the advanced age and low capability of the existing cable providers system
- Monthly Pay TV service much higher than for Internet w/average cost at $59.35 per month

Pay TV Subscribers	
Pay TV Method of Access	**% of Responses**
Cable	24%
Satellite	76%

Other Residential Services (continued)

Voice Services

- POTS, cellular and VoIP
- Verizon VoiceWing VoIP service is available on the Eastern Shore to anyone w/broadband connection w/unlimited calling for $24.95 per month (in addition to broadband charge)

Voice Communication Methods and Spending						
Voice Service	% With Service	% Without Service	Monthly Expenditure			
			No Charge	Under $35	$35 to $75	More Than $75
Regular (Wired)	99%	1%	-	29%	56%	11%
Cellular	79%	21%	-	19%	55%	26%
Voice over Internet*	18%	82%	19%	62%	19%	-

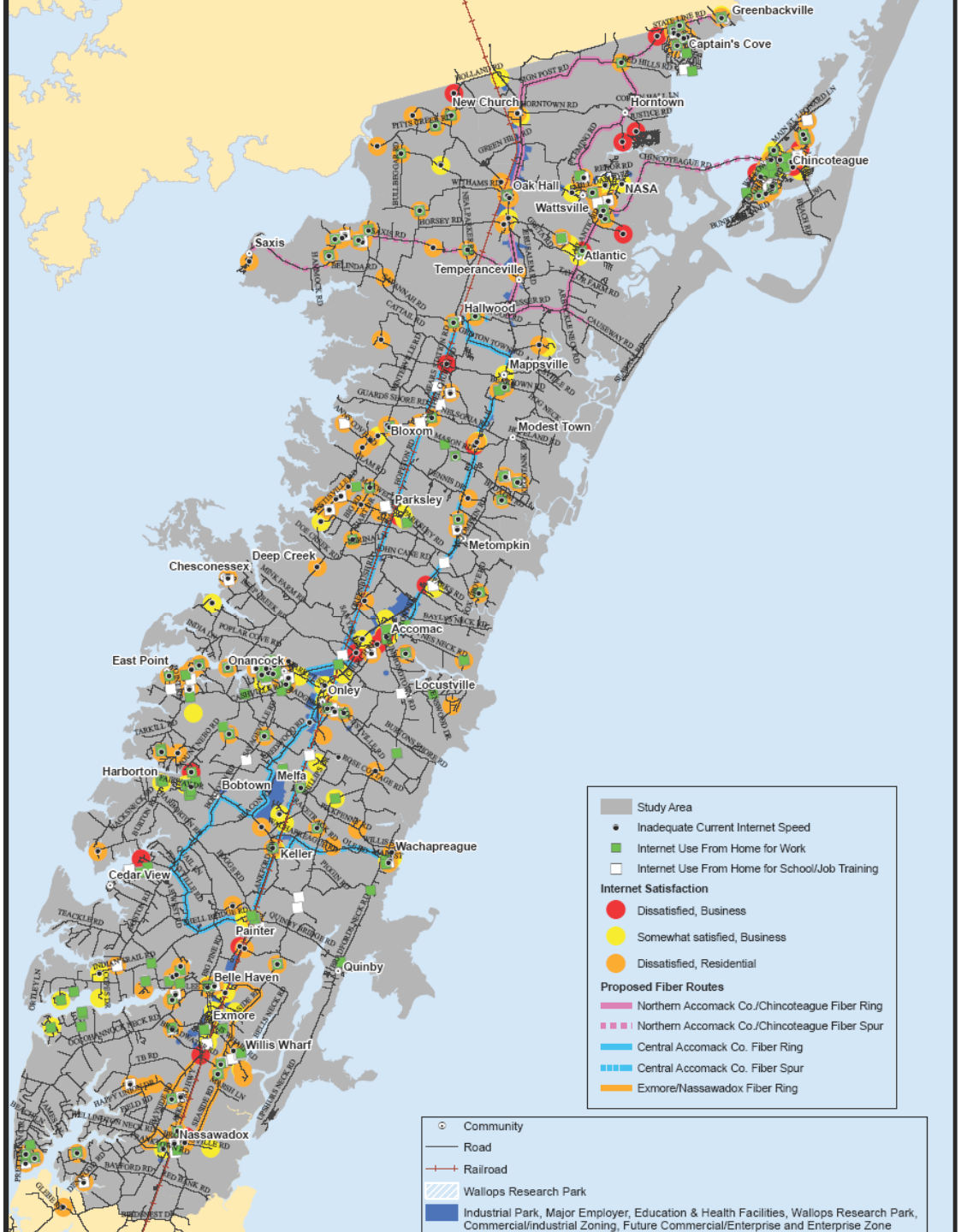
Overall Communication Satisfaction

- Overall residents on the Shore are satisfied w/current voice, video and Internet providers, however, the 46% of respondents dissatisfied w/current Internet providers or services available cannot be ignored

- Numerous comments echoed frustration w/not having a choice or providers for any communication technologies, voice, video or broadband Internet

	Satisfaction with Current Providers		
	Telephone	**Video**	**Internet**
Satisfied	**65%**	**46%**	**54%**
Not Satisfied	**22%**	**36%**	**46%**
No Opinion	**11%**	**18%**	**-**

Figure 1.7.2: "Internet Use, Satisfaction and Proposed Fiber Routes" identifies the extent of survey respondents that reported use from home for work, and Internet use from home for school and/or job training. The number of dissatisfied residential and business Internet user, as well as somewhat dissatisfied businesses, highlights that end-users expect better service

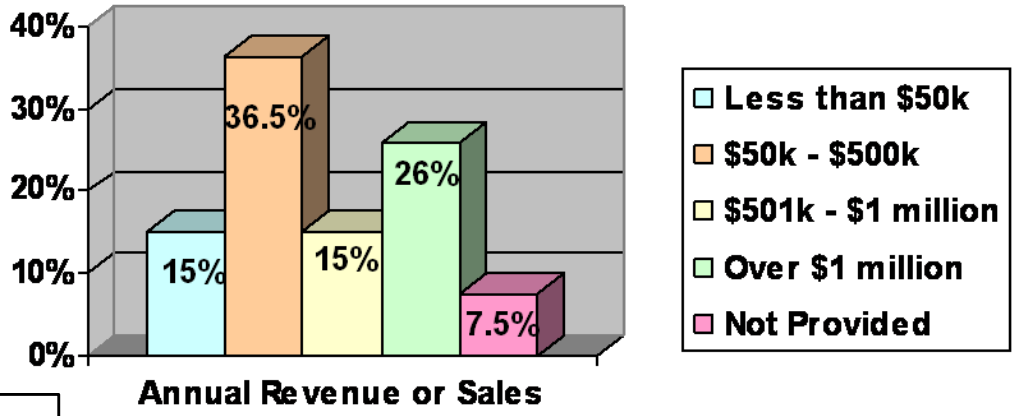


Residential Comments

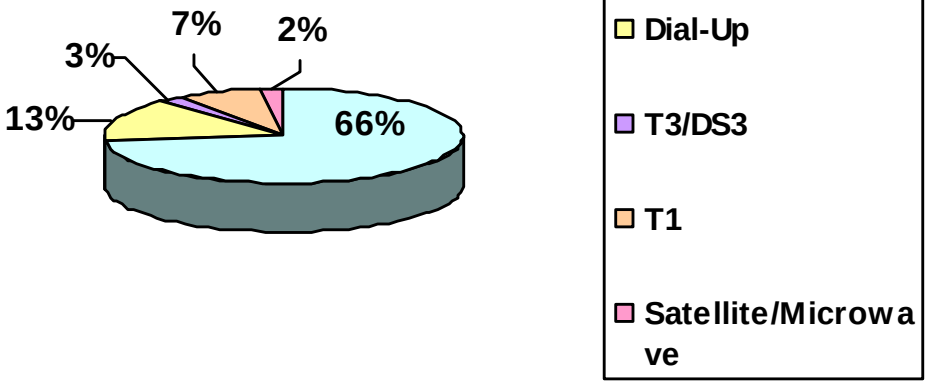
- In response to last survey question **"What changes or improvements to communication technology on the VA Eastern Shore would best meet your needs?",** 56% offered comments. Majority of comments addressed the following:
  - Desire for high speed Internet access
  - Poor cell phone reception on the Shore
  - Poor cable TV reception
  - High cost of all services
  - Desire for bundled service offerings (telephone, Internet, TV, and cell for one price)
  - Frustration w/lack of competition

Business Profiles

Respondents primarily small businesses, employing 1-4 persons with annual revenue or sales of $50k-$500k per year, although a substantial minority report revenues in excess of $1,000,000 annually



Business Method of Internet Access



Business Profiles (continued)

- Internet use by 90% of all businesses
- Largest group, 64% report 1-5 workstations have access to the Internet
- DSL most commonly used method of access among all businesses, regardless of annual revenue or numbers of employees
- Currently DSL bandwidth/speed is considered adequate to meet the needs of 82% of businesses
- No businesses reported cable modem as an access method

Business Response

- Access to Internet considered Very Important or Critical to 60% surveyed
- Overall, majority state current method of Internet access is adequate to meet their needs, yet 26% assess their current Internet access as inadequate
- Many do not know actual speed or bandwidth available
- Those businesses whose current Internet bandwidth is inadequate are primarily located in Central Accomack County. Immediate bandwidth shortages reported are as follows:
    - Chincoteague/Wallops Island -3 businesses in Chincoteague, 4 businesses in Wallops Island (23% of respondents)
    - Accomack County – 37 businesses in all other Accomack County (26% of respondents)
    - Exmore/Nassawadox/Willis Wharf – 3 businesses in Nassawadox only (12% of respondents)

Business Response

- Less than 1/3 of all businesses are Very Satisfied w/current provider, all others express various levels of dissatisfaction

Satisfaction with Current Providers	
	% of Internet Users
Very Satisfied	29%
Somewhat Satisfied	51%
Somewhat Dissatisfied	11%
Very Dissatisfied	7%

- **Dissatisfaction primarily w/connection speed and lack of bandwidth**

- Majority subscribing for service from local incumbent, and many comments indicated frequent network issues and an overall perceived lack of provider support

Business Response

- Businesses that currently have no Internet access or do not subscribe to faster-than-dial-up service indicate that availability of services is the primary reason

- Nearly 9% of the entire business survey group is not interested; a smaller percentage of respondents state higher speed services are too expensive

Reasons for Dissatisfaction with Current Providers	
	% of Internet Users
Poor connection speed, not enough bandwidth	**42%**
Price too high	23%
Poor customer service	16%
Service is unreliable	11%
Problems with Email	8%

Business Response

- Currently monthly expense for Internet access do not exceed $50 per month for the majority (63%) of businesses
- Average cost of services for this group is $31.55 per month
- Only 5% of all businesses report Internet expense in excess of $300 per month.
- Although 90% of all businesses currently have Internet access and consider access important, it appears many Eastern Shore businesses are not taking full advantage of all the Internet has to offer
- Business use of many Internet applications is lower on the Shore than that reported in other areas of the country

How Eastern Shore Businesses Are Using the Internet, Current and Future

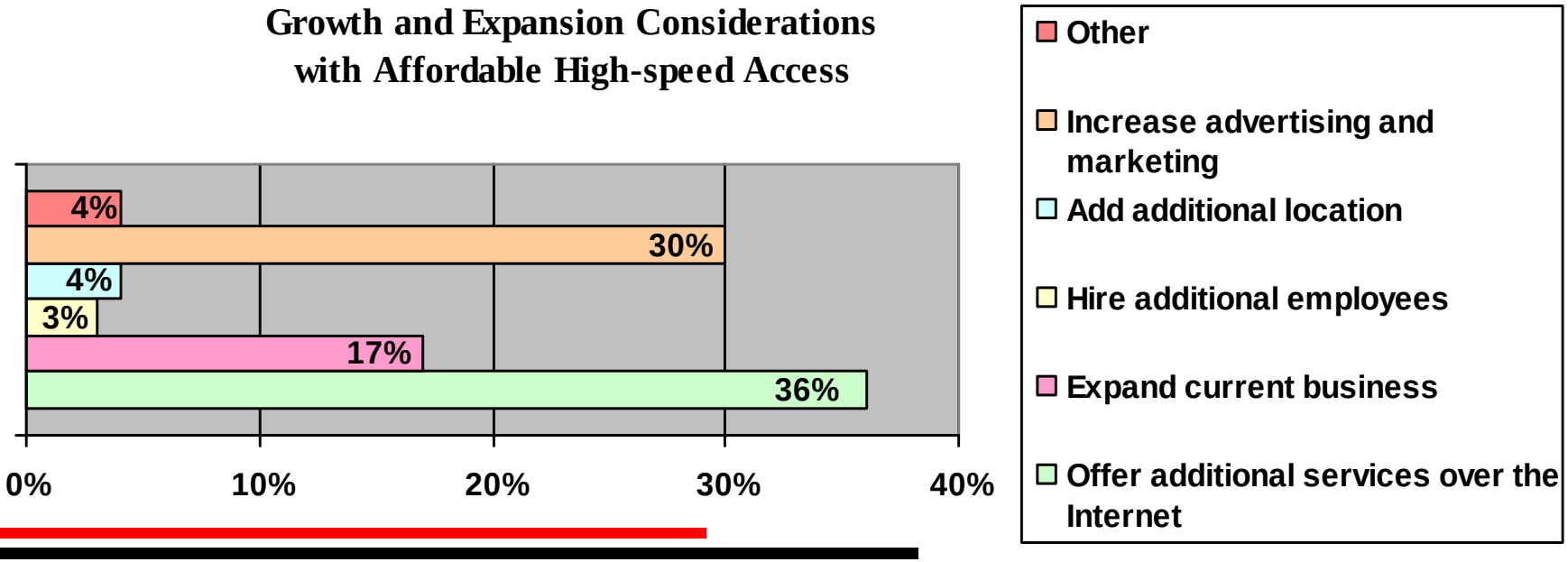
How Businesses Are Using the Internet Current and Future Interest of Respondents		
Internet Use	**Current Use**	**Anticipated Future Use**
E-Mail	63%	3%
Research	53%	5%
Purchasing materials or services	51%	6%
Customer service	42%	14%
Accounting/Banking	41%	7%
Advertising	36%	13%
Hosting your web site	34%	**17%**
Transferring data files	34%	7%
Training	22%	**15%**
On-line sales	15%	**18%**
Distance Learning	13%	15%
Communication	6%	4%
VPN connections	5%	7%
Video-conferencing	4%	**17%**
Telemedicine	2%	6%
Voice service	2%	14%

Businesses Opportunities

- 69% of all business survey respondents identified one or more growth opportunities they would consider if an affordable high-speed Internet service were available to them

- This indicates future growth of e-commerce on the Shore

- Strong percentage of businesses understand the value of the Internet



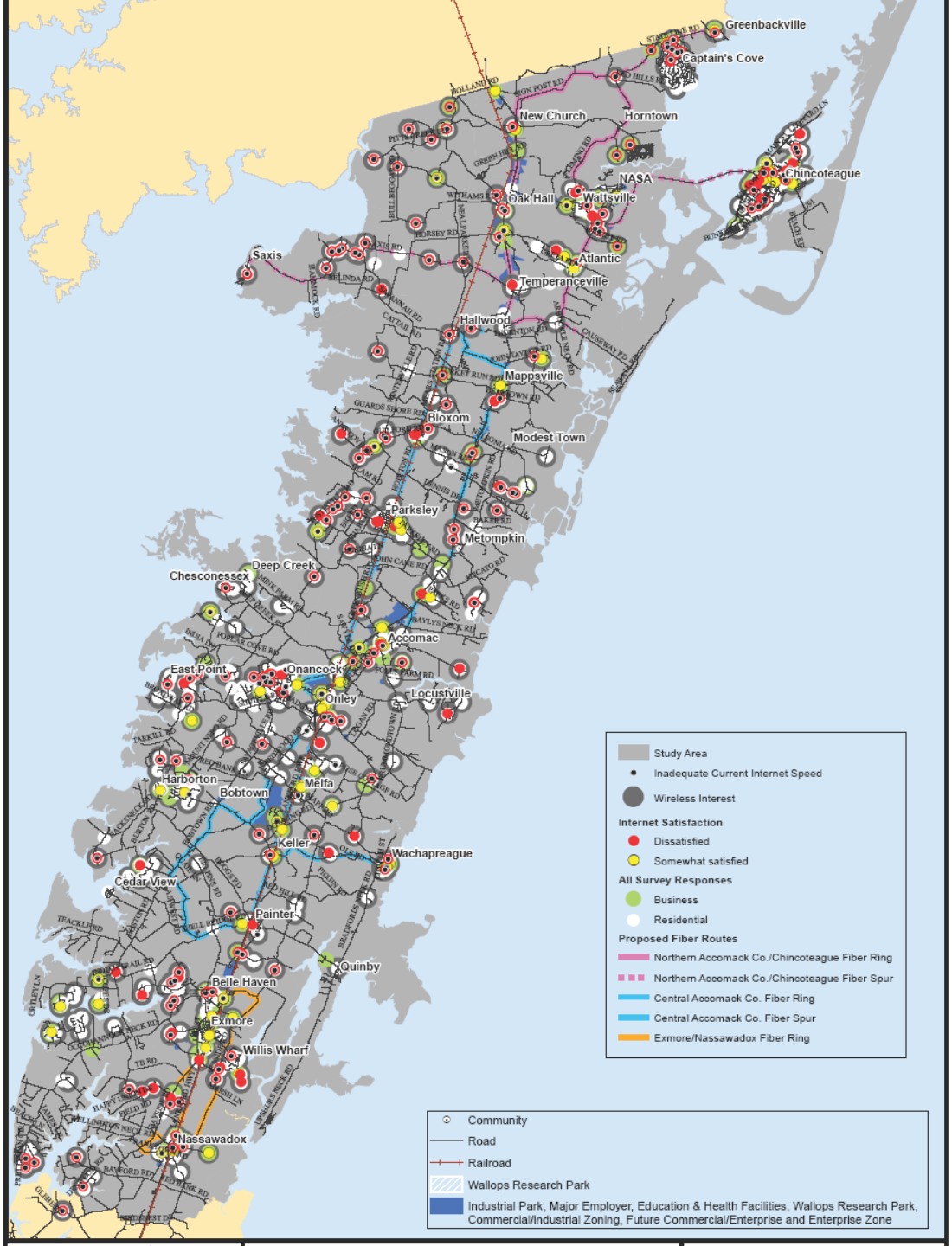
Opportunities Offered by Respondents

- Increase Productivity
- Save Time
- File Claims Electronically
- Deliver Current Services Faster
- Improve Remote Office Options
- Attract More Customers

- A majority of business survey respondents (76%) indicate they are very to somewhat likely to use wireless high-speed Internet access service if is was available to them

- Of businesses that state current Internet speeds and bandwidth is inadequate, 91% are interested in high-speed wireless access to meet their needs

Figure 1.7.3: "Inadequate Speed, Wireless Interest, Survey Responses and Proposed Fiber Routes" overwhelmingly indicates the interest in wireless technology if available. All industrial parks, major employers, education and health facilities, Wallops Island Research Park, commercial/industrial zoning, and future commercial/Enterprise zones are shown as a solid blue color so as to easily identify the geographical location to the selected proposed fiber routes.



Business Voice Services

- Most maintain regular telephone lines (99% overall), the majority spending between $101 and $300 per month
- Most also subscribe to cell phone service
- While just over ½ are spending less than $100 per month, the rest are spending considerably more
- End-users provided numerous comments that expressed frustration w/poor cellular coverage on the Shore and high dissatisfaction w/their provider

Business Voice Communication Methods and Spending						
Voice Service	% With Service	% Without Service	Monthly Expenditure			
			No Charge	Under $100	$100 to $300	More Than $300
Regular (Wired)	99%	1%	-	33%	39%	28%
Cellular	84%	16%	-	52%	41%	7%

Business Voice Services (continued)

- Only 21% of businesses w/Internet access have adopted VoIP

- Small businesses utilizing DSL for Internet access can also subscribe for VoIP from Verizon (Verizon VoiceWing), using their Internet connection for making voice calls

Business Voice Communication Methods and Spending							
Voice Service	**% of Internet Subscribers with Service**	**% Without Service**	**Monthly Expenditure**				
			No Charge	**Under $35**	**$35 to $45**	**$46 - $100**	**Over $100**
Voice over Internet	21% of Internet subscribers	79%	13%	34%	19%	29%	5%

Business Comments

- In response to the last survey question, **"What changes or improvements to communication technology on the VA Eastern Shore would best meet your needs?",** 39% of the business group offered comments.
- The majority of comments addressed the following issues:
  - Desire for increased Internet access speeds, more bandwidth needed
  - "Broadband" access specifically requested
  - Affordable access options
  - DSL or cable modem availability to more areas
  - Better Cell Phone Coverage

Analysis

Gap Analysis

- Residential and Business
- Education
- Health Care
- Libraries
- E-Government / Public Safety

Current & Future Education / Resource Gaps

- Training
- Help Desk Support
- Computer Training
- Funding

Gap Analysis

- DSL service is available to a wide range of both residential and business consumers.
- Current DSL customers express frustration with unreliable service, citing network outages that last for days instead of hours.
- Businesses requiring higher speed access immediately account for 26% of respondents, and nearly 62% of all businesses express some level of dissatisfaction with current providers.
- The greatest amount of frustration (61%) is attributed to slow speed and a lack of bandwidth.
- Price will be a limiting factor in decisions to purchase higher bandwidth.
- Of those businesses that are currently dissatisfied, 33% cite price as a reason. Of those businesses citing price dissatisfaction, 44% are currently paying between $30 and $50 per month for DSL service.
- This indicates significant pressure for new broadband access methods at pricing below current DSL service pricing.

Gap Analysis (continued)

- Educational institutions exhibit the greatest bandwidth need, primarily to distribute distance learning resources among individual schools and to future planned learning sites such as the proposed Research Park.
- Current Internet connections (DS3, full and partial – 10-45 Mbps) are sufficient at this time for Internet access.
- Current T1 (1.5 Mbps) connections between each public school and the District offices are insufficient to utilize video conferencing and streaming video distance learning resources available to them.
- Future planned distance learning curriculum proposed for the ESCC site in the Research Park will require a high-bandwidth connection, beyond the capabilities currently available on the Shore.

Gap Analysis (continued)

- The public libraries located in Chincoteague and Nassawadox are in need of Internet access in excess of current, affordable DSL services (maximum 3 Mbps) purchased by two of the libraries.
- The main library branch in Accomac currently utilizes 1.5 Mbps over frame relay, and the bandwidth is strained.
- Since the library circulation system is web-based, staff in each library needs a portion of the bandwidth reserved for their use with the remainder sufficient to support fairly constant use by patrons.
- Beyond bandwidth for Internet access, the libraries are in need of updated, faster computers.
- Chincoteague library is open during limited hours, and not year-round. This limits access to Internet access by patrons who cannot afford a computer or access at home, particularly students who need the access to complete school assignments and job seekers.

Gap Analysis (continued)

- Municipal facilities currently need dedicated bandwidth between sites, including public safety, to enable a secure, cohesive network and Internet access distributed between all facilities

- While Internet access is not currently an issue, connectivity between sites using current available technologies is slow and the bandwidth inadequate

- Municipalities are currently unable to offer a number of e-government services that would improve service to the communities.

Current & Future Education / Resource Gaps

Training

- Eastern Shore residents and businesses currently have many fee-based options to receive training on computer use;
  - basic word processing, database and presentation applications;
  - specialized industrial training and certification.
- Pricing for training is not unreasonable compared to private training firms.
- Financial assistance is available for employment training services to those that meet eligibility requirements under the Workforce Investment Act.
- What is lacking is an understanding of the value of using advanced technology skills and many new applications of the Internet. Job seekers and current employees will complete training when required by employers. It is the Eastern Shore employers who must be shown the value of adopting new technologies and Internet applications.

Current & Future Education / Resource Gaps (continued)

- Libraries must rely on volunteers to offer and conduct training, and there is a lack of both volunteers and space for adding additional computer stations to accommodate classes. Currently, there is no drive to solicit volunteers to conduct training. Budget shortfalls preclude purchasing additional workstations and space is a limiting factor specifically in Chincoteague. Additionally, the Chincoteague library is not open year-round and has limited business hours.

Help Desk Support

- A significant number of both residents and businesses express frustration with service provider customer service. There is a need for a local help desk to provide immediate support for issues that may not require action on the part of service providers.

Current & Future Education / Resource Gaps (continued)

Computer Equipment

- Income levels vary, and some residents simply cannot afford to purchase computers. Accomack Public School officials estimate as many as 40% of students may not have access to computers at home. For these students, free Internet access at a local library or community center is critical. Programs for donating used computers should be specifically targeted to families with children. Current computer donation programs are targeted towards GED students, but not families with younger school-age children

Funding

- All local sources contacted for input into this study exhibit an understanding of the necessity of affordable training options and the importance of marketing those options to the community. Nearly all are confined by a lack of available funding resources. Grant opportunities do exist but require extensive research and preparation beyond current staffing capabilities.

Broadband Education Development Strategies

Computer Refurbishing and Redistribution

- Current computer donation programs that supply refurbished computers to GED students should be expanded to include families without computers, particularly to those with younger school aged children for early intervention.
- Federal computer donation programs should be reviewed and local drives to encourage large employers to donate computers are suggested

Computer Purchase Program

- Working with the Dell Corporation, Apple Computers and a local credit union, Communities may be able to offer a program whereby families could purchase computers and dial-up Internet access.

Broadband Education Development Strategies (continued)

Community Intranet

- According to local sources, information is still most commonly communicated on the Shore by word-of-mouth, followed by radio. While this is typical for small towns in years past, it is inadequate today.
- The current Eastern Shore Portal (www.easternshorevirginiaportal.com) is a promising start to a community intranet, whereby Eastern Shore residents can access community information.
- All municipalities should be encouraged to participate and update information frequently.
- Citizens should be encouraged to utilize the Portal as their start page, where they can get instant news and information.
- Opportunities for training, seminars and workshops should be prominently featured along with upcoming community events.
- Key to the Portals success are links to the school districts, community health providers, online learning sites, and local businesses, enticing users to explore and frequent the site. In addition, this site should serve as the entrance to Economic Development information vital to those considering the Shore for a new business location.
- All Eastern Shore businesses should be represented and links to business web sites provided.

Broadband Education Development Strategies (continued)

E-Government

- A large number of Eastern Shore residents are turning to the Internet for news; in the past six months, 72% have visited a news website and 59% a state or local government site. This represents an opportunity to promote e-government services to citizens, saving time and increasing productivity. All municipalities should have a web presence, accessible from the Portal and providing access to forms, online payments when possible, council meeting minutes, and contact information.

E-Commerce

- The Eastern Shore is isolated geographically from the rest of Virginia and does not have the benefit of commerce from those 'passing through'. It is critical for Shore businesses to be proactive in marketing their products and services.
- Home-based businesses should also be included in the business listings on the Portal. In this manner, the Portal itself operates as a business incubator.

Broadband Education Development Strategies (continued)

Training on Internet Use

- The majority of residents and businesses are using the Internet, without realizing the full advantages the Internet offers. **Training should include hands-on workshops** whereby students actually place an item for sale on an online auction such as eBay. Additional training should be aimed at businesses as to where and how to market their business online.
- Entry level training on the Shore should continue to be low to no-cost to encourage as many as possible to participate, and to reach as many segments of the population as possible. Without funding options, libraries should organize opportunities for training classes that are Internet specific such as selling online and using search engines to conduct research. Volunteers are a critical component to filling training needs in the libraries or community centers, and municipal support is needed to advertise for trainers.

Broadband Education Development Strategies (continued)

Lead by Example

- Local businesses that have established websites, are conducting commerce via the Internet, and are the perfect spokespersons for educating others on the advantages of technology.

- Opportunities for business leaders to assist can be organized by the Chamber of Commerce, promoted through economic development workshops and marketed through the Portal.

- Local networking groups such as BusiNet provide support for business success, and additional groups should be encouraged throughout the Shore.

Broadband Education Development Strategies (continued)

The Broadband Experience

- Municipalities who have led the way by building fiber optic networks in their communities have made kiosks available for their citizens to see, feel and experience 'broadband'. Community venues include city halls, local shopping mall exhibits, chamber of commerce events, and public works buildings.

Encourage Local Provider Service Marketing

- Too many businesses on the Shore do not understand the value of Internet applications beyond email and research.
- Many applications are available for use today, and local Internet providers offer services to support their use. Service providers should tailor marketing of these products towards Eastern Shore businesses, with emphasis on the value these applications can potentially provide to the business.

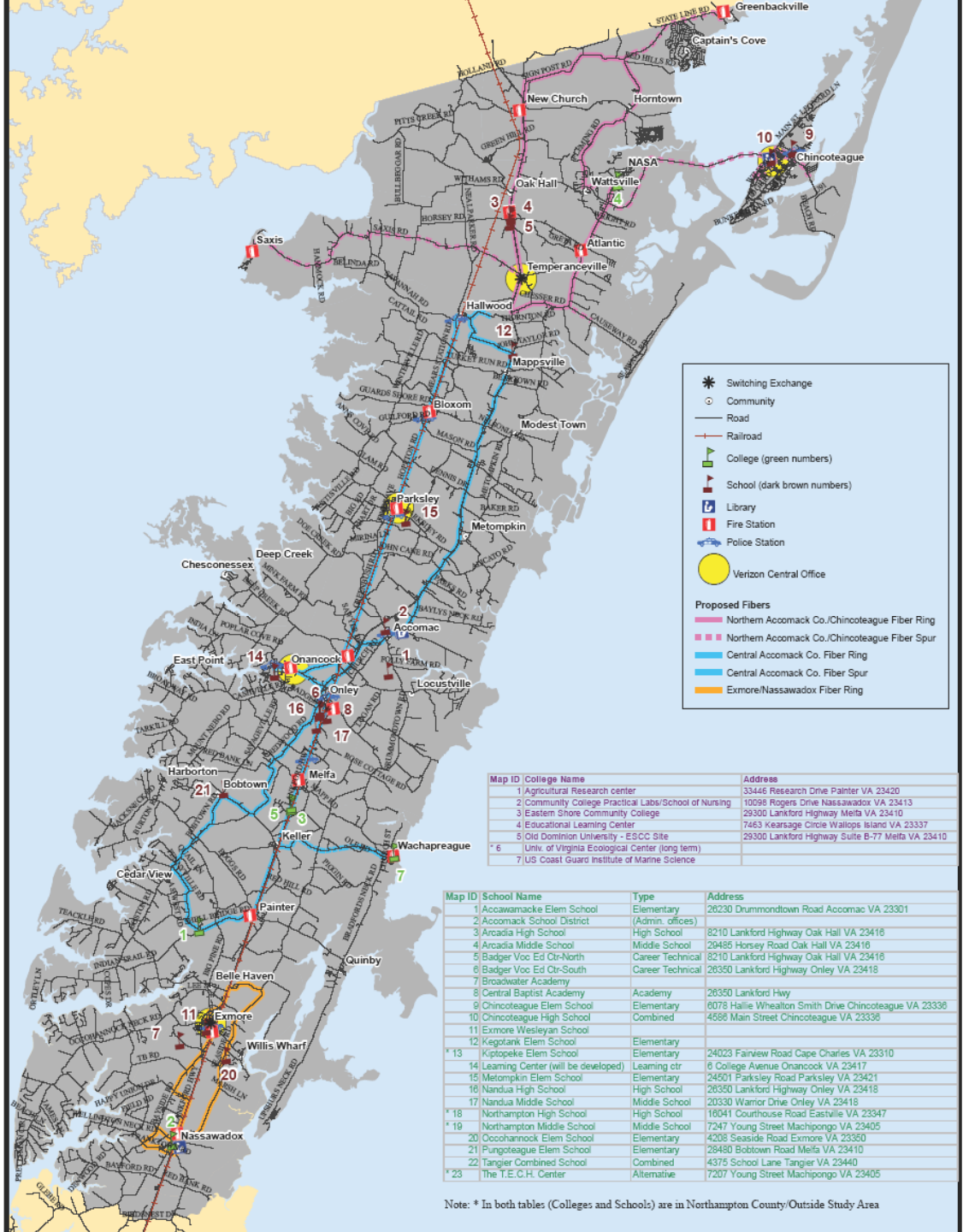
Focus of the VDHCD Grant Program

- To initially ensure high speed connectivity to businesses, education institutions, and health care facilities.

- The plan is to address, from a strategic planning perspective recommendations for future implementation efforts to address the needs and provide opportunities for residential users to have access and choice for high speed broadband at competitive prices. Universal access is not to be the primary focus of the planning.

- The program encourages an emphasis on collaborations with the private-sector providers, to maximize the provision and affordability of services to the communities at large, open access networks provide a great architecture for the public and private sectors to work together.

Figure 1.5-A: "Education, Public Safety and Select Verizon Facilities, and Proposed Fiber Routes" provides names and addresses (mapped geographic locations) of facilities and institutions

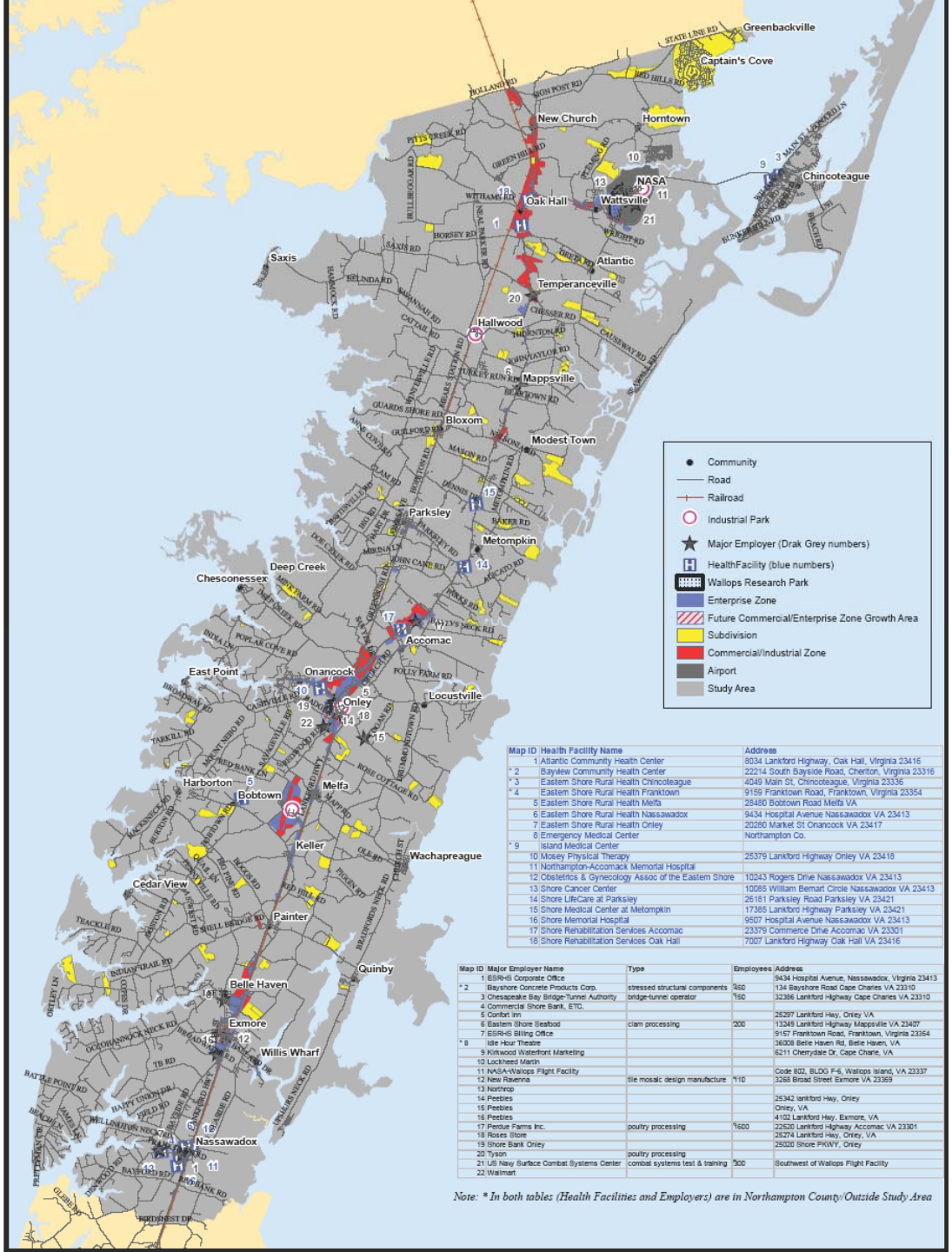


Map ID	College Name	Address
1	Agricultural Research center	33446 Research Drive Painter VA 23420
2	Community College Practical Labs/School of Nursing	10096 Rogers Drive Nassawadox VA 23413
3	Eastern Shore Community College	29300 Lankford Highway Melfa VA 23410
4	Educational Learning Center	7463 Kearsage Circle Wallops Island VA 23337
5	Old Dominion University - ESCC Site	29300 Lankford Highway Suite B-77 Melfa VA 23410
* 6	Univ. of Virginia Ecological Center (long term)	
7	US Coast Guard Institute of Marine Science	

Map ID	School Name	Type	Address
1	Accawamacke Elem School	Elementary	26230 Drummondtown Road Accomac VA 23301
2	Accomack School District	(Admin. offices)	
3	Arcadia High School	High School	8210 Lankford Highway Oak Hall VA 23416
4	Arcadia Middle School	Middle School	29485 Horsey Road Oak Hall VA 23416
5	Badger Voc Ed Ctr-North	Career Technical	8210 Lankford Highway Oak Hall VA 23416
6	Badger Voc Ed Ctr-South	Career Technical	26350 Lankford Highway Onley VA 23418
7	Broadwater Academy		
8	Central Baptist Academy	Academy	26350 Lankford Hwy
9	Chincoteague Elem School	Elementary	6078 Hallie Wheelton Smith Drive Chincoteague VA 23336
10	Chincoteague High School	Combined	4586 Main Street Chincoteague VA 23336
11	Exmore Wesleyan School		
12	Kegotank Elem School	Elementary	
* 13	Kiptopeke Elem School	Elementary	24023 Fairview Road Cape Charles VA 23310
14	Learning Center (will be developed)	Learning ctr	6 College Avenue Onancock VA 23417
15	Metompkin Elem School	Elementary	24501 Parksley Road Parksley VA 23421
16	Nandua High School	High School	26350 Lankford Highway Onley VA 23418
17	Nandua Middle School	Middle School	20330 Warrior Drive Onley VA 23418
* 18	Northampton High School	High School	16041 Courthouse Road Eastville VA 23347
* 19	Northampton Middle School	Middle School	7247 Young Street Machipongo VA 23405
20	Occohannock Elem School	Elementary	4208 Seaside Road Exmore VA 23350
21	Pungoteague Elem School	Elementary	26480 Bobtown Road Melfa VA 23410
22	Tangier Combined School	Combined	4375 School Lane Tangier VA 23440
* 23	The T.E.C.H. Center	Alternative	7207 Young Street Machipongo VA 23405

Note: * In both tables (Colleges and Schools) are in Northampton County/Outside Study Area

Figure 1.5-B: "Health Care Facilities and Major Employers" provides name and address (mapped geographic location) of facilities and employers identified



Map ID	Health Facility Name	Address
1	Atlantic Community Health Center	8034 Lankford Highway, Oak Hall, Virginia 23416
* 2	Bayview Community Health Center	22214 South Bayside Road, Cheriton, Virginia 23316
* 3	Eastern Shore Rural Health Chincoteague	4049 Main St, Chincoteague, Virginia 23336
* 4	Eastern Shore Rural Health Franktown	9159 Franktown Road, Franktown, Virginia 23354
5	Eastern Shore Rural Health Melfa	28480 Bobtown Road Melfa VA
6	Eastern Shore Rural Health Nassawadox	9434 Hospital Avenue Nassawadox VA 23413
7	Eastern Shore Rural Health Onley	20280 Market St Onancock VA 23417
8	Emergency Medical Center	Northampton Co.
* 9	Island Medical Center	
10	Mosey Physical Therapy	25379 Lankford Highway Onley VA 23418
11	Northampton-Accomack Memorial Hospital	
12	Obstetrics & Gynecology Assoc of the Eastern Shore	10243 Rogers Drive Nassawadox VA 23413
13	Shore Cancer Center	10085 William Bernart Circle Nassawadox VA 23413
14	Shore LifeCare at Parksley	26181 Parksley Road Parksley VA 23421
15	Shore Medical Center at Metompkin	17385 Lankford Highway Parksley VA 23421
16	Shore Memorial Hospital	9507 Hospital Avenue Nassawadox VA 23413
17	Shore Rehabilitation Services Accomac	23379 Commerce Drive Accomac VA 23301
18	Shore Rehabilitation Services Oak Hall	7007 Lankford Highway Oak Hall VA 23416

Map ID	Major Employer Name	Type	Employees	Address
1	ESRHS Corporate Office			9434 Hospital Avenue, Nassawadox, Virginia 23413
* 2	Bayshore Concrete Products Corp.	stressed structural components	250	134 Bayshore Road Cape Charles VA 23310
3	Chesapeake Bay Bridge-Tunnel Authority	bridge-tunnel operator	150	32386 Lankford Highway Cape Charles VA 23310
4	Commercial Shore Bank, ETC.			
5	Comfort Inn			25297 Lankford Hwy, Onley VA
6	Eastern Shore Seafood	clam processing	200	13349 Lankford Highway Mappsville VA 23407
7	ESRHS Billing Office			9157 Franktown Road, Franktown, Virginia 23364
* 8	Idle Hour Theatre			36008 Belle Haven Rd, Belle Haven, VA
9	Kirkwood Waterfront Marketing			6211 Cherrydale Dr, Cape Charle, VA
10	Lockheed Martin			
11	NASA-Wallops Flight Facility			Code 802, BLDG F-6, Wallops Island, VA 23337
12	New Ravenna	tile mosaic design manufacture	110	3268 Broad Street Exmore VA 23369
13	Northrop			
14	Peebles			25342 lankford Hwy, Onley
15	Peebles			Onley, VA
16	Peebles			4102 Lankford Hwy, Exmore, VA
17	Perdue Farms Inc.	poultry processing	1600	22520 Lankford Highway Accomac VA 23301
18	Roses Store			25274 Lankford Hwy, Onley, VA
19	Shore Bank Onley			25020 Shore PKWY, Onley
20	Tyson	poultry processing		
21	US Navy Surface Combat Systems Center	combat systems test & training	500	Southwest of Wallops Flight Facility
22	Walmart			

*Note: * In both tables (Health Facilities and Employers) are in Northampton County/Outside Study Area*

Network Design

- A fiber optic distribution network was investigated for connectivity to the priority end-users, which can also be used to support a wireless solution to reach the more rural areas.
- Fiber optics is considered the most future-proof technology available to-day
- Main Network, Distribution Network, Access Network
- Definition of open access networks varies in meaning to different stakeholders in a community. Some examples include:
  - Customer Perspective: The end-user can choose to receive service from any number of multiple service providers offering comparably priced and quality of services over a common last mile infrastructure.
  - Local Government Perspective: A ubiquitous communication system that provides abundant and affordable bandwidth as an attraction to companies to locate or stay in the community for economic development gain, jobs and increased tax base.
  - Service Provider Perspective: A network for wholesale access consistent within new regulatory framework of electronic telecommunications capabilities and rules of competition.

Network Architecture

Types of Open Access Network Architecture

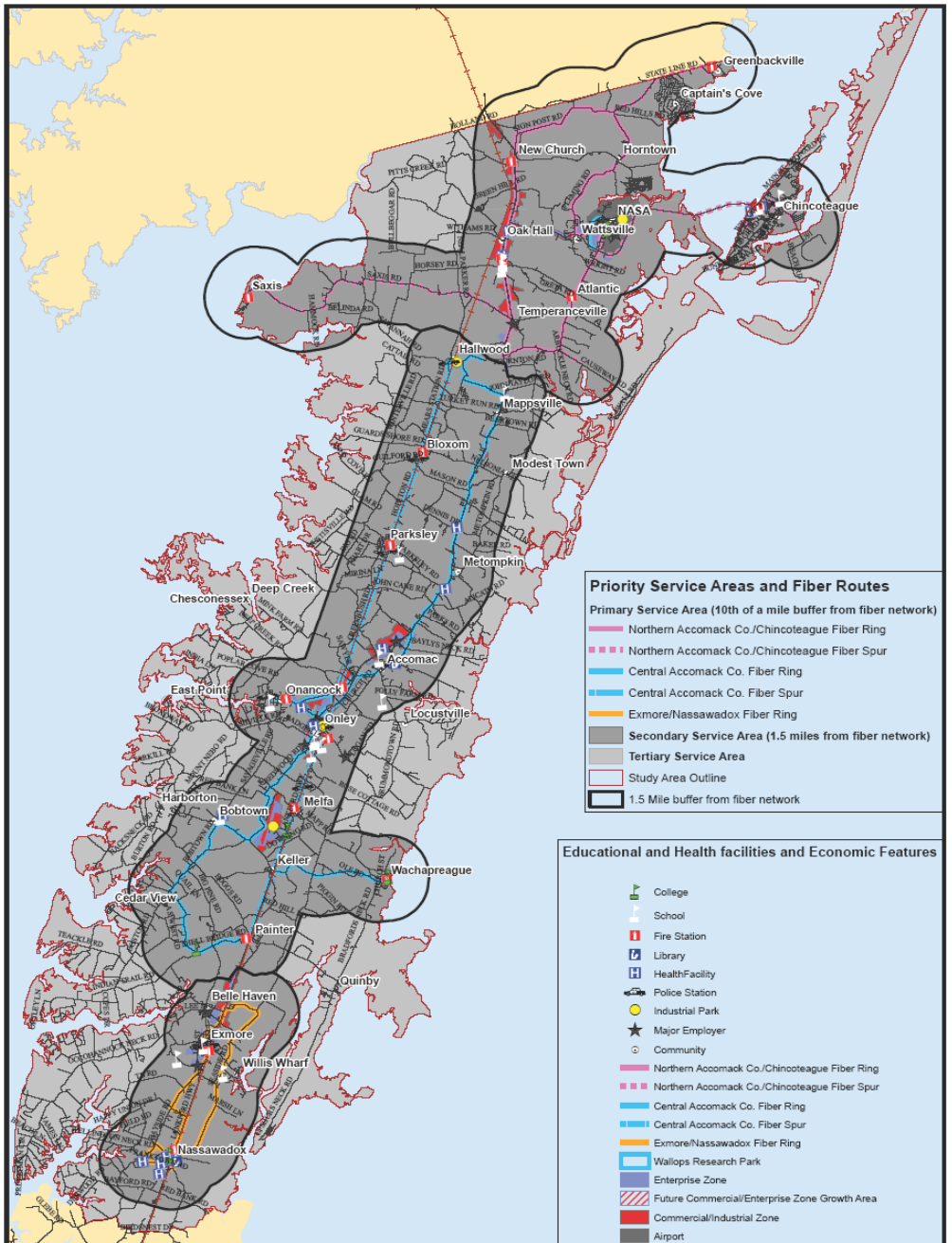
- Active Star Design
- Passive Star Design
- Home Run Design
- Wave Division Multiplexing (WDM) Passive Optical Network (PON) Design

Common Models

- Depending on budget, desired competition for certain services, distance of the network, number of premises to serve, and many other factors need to be considered when deciding what design to pursue. These factors also drive the type infrastructure platform (Layers of Open Access Architecture) and role of the network owner. The most common models include:
  - Layer 0: Provide conduit and collocation facilities only
  - Layer 1: (Physical Layer Unbundling) Building dark fiber to lease or unbundled the optical layer where each service provider transmits on its own wave length using coarse wavelength division multiplexing or dense wavelength division multiplexing.
  - Layer 2: (Data Link Layer Unbundling) Build optical fiber network and supply the electronics on the front-end and back-end.
  - Layer 3: (Network Layer Unbundling) An Internet Protocol (IP) service layer is provided over a basic network, such an a Hybrid-Fiber-Coax (HFC) network.

Figure ES-A "Priority Service Areas and Network in Relation to Economic Development Features, Education Institutions, and Health Care Facilities" graphically identifies where, why and in what priority the particular wire line and wireless technology should be pursued.

It can be noted that all the educational institutions, health care facilities and major employers are located within the Primary and Secondary Service Areas.



Priority Areas

- The proposed fiber distribution network itself and the premises located within 0.1 miles (528 feet) along the route are being considered the "Primary Service Area". It is proposed a direct fiber optic build to the premise be the access network technology used. While fiber optic technology is proposed as the relied upon network, undoubtedly some of the same end-users may also subscribe to a wireless solution as a convenience technology to augment the fiber line use.

- The areas between the 0.1 mile and one and one-half (1-1/2) miles of the distribution network route were identified as the second priority areas ("Secondary Service Area" location). It is proposed either a direct fiber optic build to the premise, or a wireless solution be used as the access technologies. Not one technology or the other is expected to be used throughout the Secondary Service Area, but both. For some locations and customers, it may not be cost feasible to have a direct fiber line as the reliable network solution. If a wireless solution is used, it will most likely be augmented with some other form of existing wire line technology such as twisted pair telephone lines to ensure emergency and other communications required reliability exists in the event the wireless has interference or goes down completely.

Priority Areas (continued)

- The third priority areas to concentrate on enhancing at least broadband would be the more rural areas located more than one and one-half (1-1/2) miles from the distribution network ("Tertiary Service Area" location). A wireless solution is expected to be the more practical access network technology used. Again, it will most likely be augmented with some other form of existing wire line technology such as twisted pair telephone lines to ensure reliability.

Figure 4.0-A: "Housing Units Density per Square Mile"

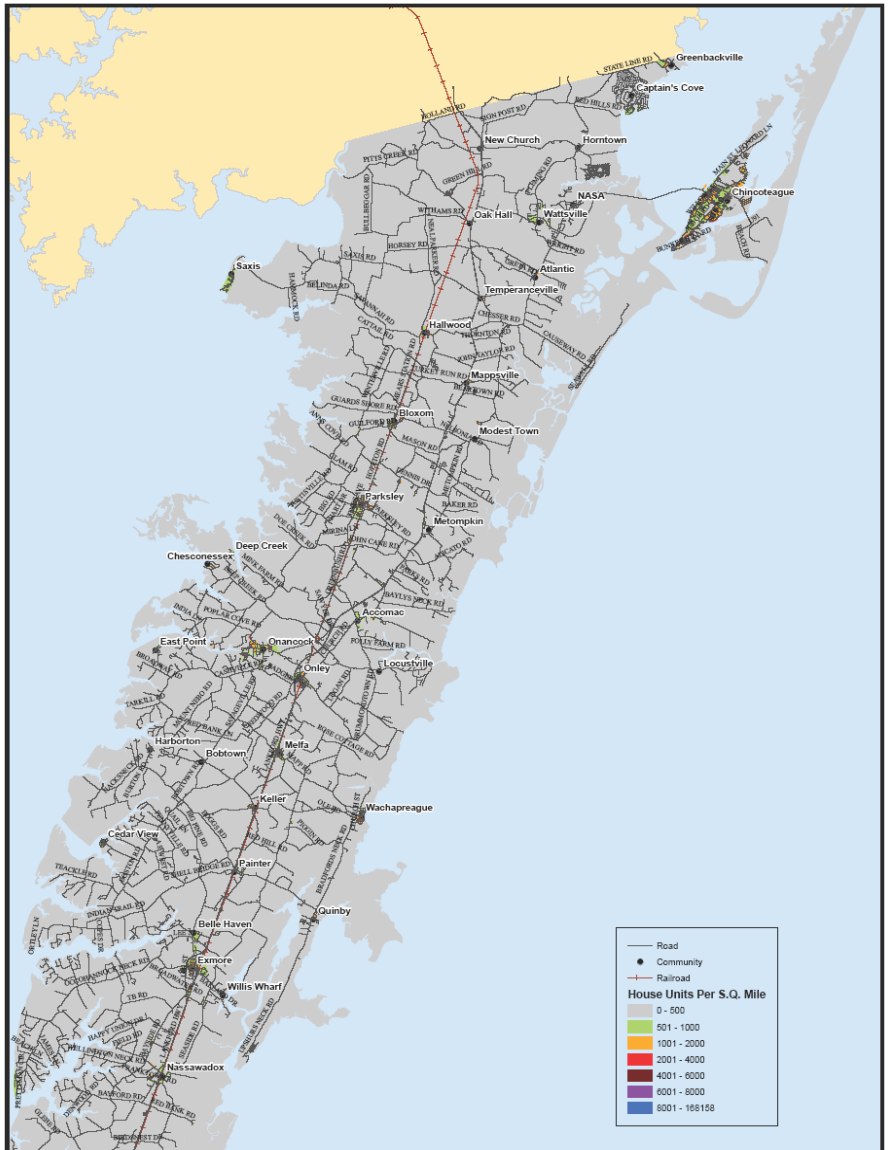


Figure 4.0-B "Population Distribution"

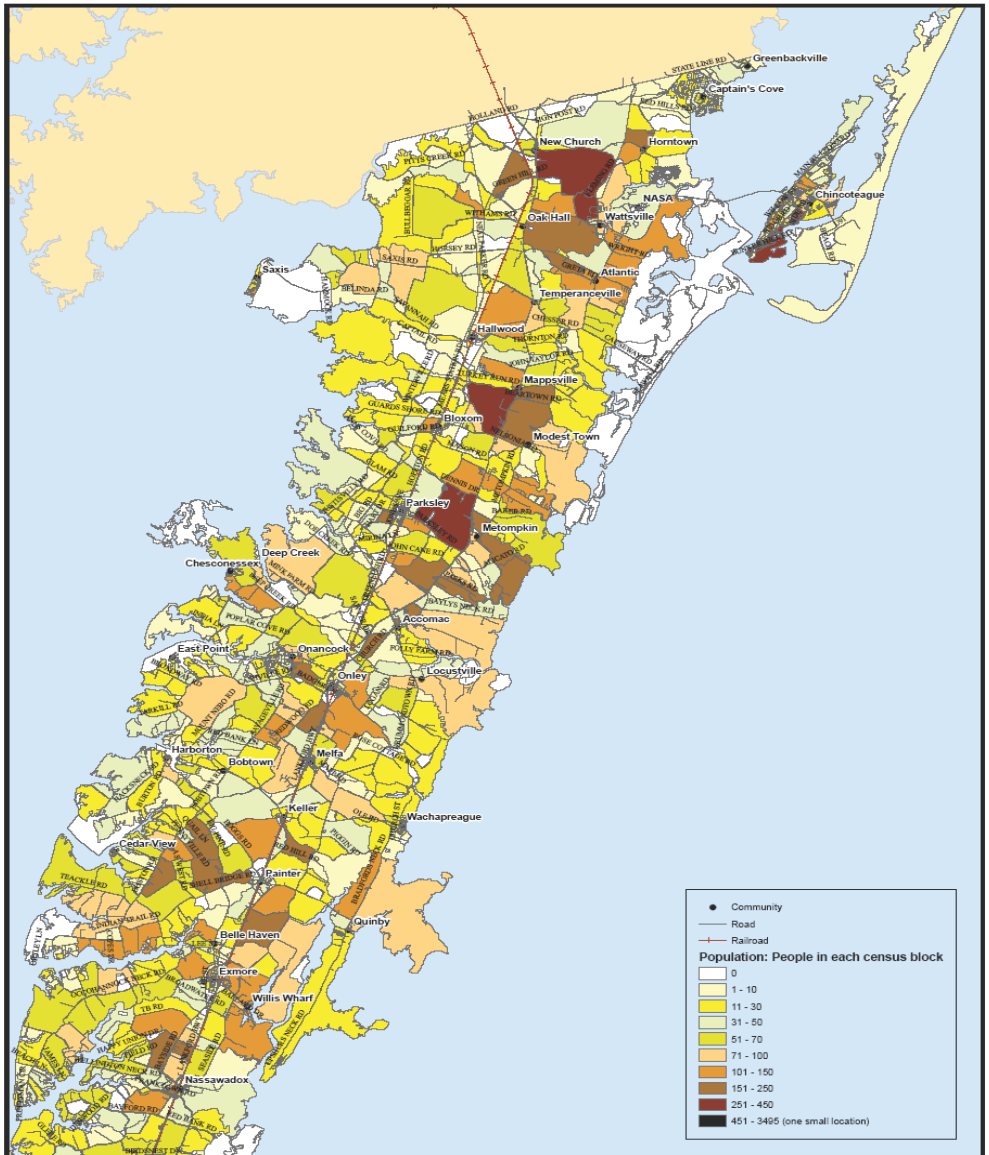


Table ES-A: Dark Fiber Costs for Fiber Optic Distribution Networks

Project Component	Chincoteague and Northern Accomack	Central Accomack Area	Exmore-Nassawadox and Southern Accomack	All Three Areas		Chincoteague and County Area without the Greenback and Saxis Spurs
Approx. Fiber Length	54 Miles	65 Miles	20 Miles	139 Miles		38 Miles
Fiber Design and Construction Costs (Millions)	$1.67 - $2.5	$2.1 - $3.2	$0.73 - $1.1	$4.5 - $6.8		$1.2 - $1.8
Per Subscriber Costs (Estimated Average)	$1,278 for 1,635 Subscribers	$1,647 for 1,617 Subscribers	$1,886 for 484 Subscribers	$1,517 for 3,736 Subscribers		$1,030 for 1,472 Subscribers

Operations and Funding

- **Network Operations, Organization**
  - Virginia law – limitations and requirements
  - Business Model Options: Ownership and Operations Structuring (Governance Plan)
  - Provider interest
    - Interview service providers, present subscriber business case, show demand
    - Investigate options for provider involvement, willingness to participate, what they need to succeed
  - Regional connectivity options
    - Fiber in or passing through
    - Potential fiber partners
    - Wireless spectrum use

- **Funding Strategies**
  - Capital funding options - document options available
  - Grants, loans
  - In-kind contribution options
  - Community partner funding

Next Steps

- Solicit a Request for Interest (RFI) from Service Providers reagarding interest of use of an open access distribution network on the Eastern Shore
- Pursue developing a Master Plan w/Commonwealth of Virginia, Mid-Atlantic Broadband Cooperative, Maryland Broadband Cooperative, Lower Shore Broadband Cooperative and Local Service Providers
- Assuming there is some level of interest by an entity based on the outcome of the RFI, seek commitment from the communities for funding the public portion of the solution and modify the plan as need be to fit the commitment level (take a phased-in approach)
- Do not commit extensive funding towards further design and construction until service providers are committted to using an open access network and all business and government obligations are secured
- Seek the best source of funding that would not place a financial burden on the communities if the final business plan does not become implemented within expected time frames. Have a fall back position to itigate such a potential fininacial burden such as the ability to sell the network and recover investment costs.

Next Steps (continued)

- Develop a business plan that would be difficult to challenge under VA Law pertaining to the permissible role of municipalities in communication networks
- Work with service providers to develop last mile access models to determine best solutions
- Continue to educate local government constituency and elected officials of the contributing role broadband plays in economic development considerations, educational opportunities and overall improvement of quality of life
- Continue to investigate and review popular business models that the communities of the Eastern Shore would be comfortable with.
- Keep the momentum moving forward; once stalled, it is difficult to get moving again and difficult to rekindle support

Business Modeling

Public vs. Private Business Model

- Communities generally enter into telecommunications initiatives with the intent to improve government services, maximize teaching and learning opportunities, focus on attracting economic development activities to retain or grow business which provides increased tax base and employment opportunities, create an additional revenue source and improve the overall quality of life for families and businesses who call the municipality home.

- **Unlike the private sector business model, communities do not necessarily need to recover their investment in a short three to five years**, but rather want to cover expenses and investment so as to not place a financial burden on the community. In many instances, the for-profit business model results in service providers not making capital investment in building infrastructure into more rural areas where less aggregation of demand makes it difficult to recover the investment in the expected timeframe.

Arguments by For-Profit Companies

Arguments by for-profit companies against municipal involvement include:

- Government competing against private sector
- Subsidized competition and unfair and non-level playing field
- Unequaled regulation compliance requirements
- Inexperience and lacking technical know-how to operate a communications network
- DSL and cable modem already exist to some degree in many rural areas

Business Modeling

Mitigation of Arguments

Many communities (and some state legislation) address expansion of infrastructure and services with the following approach:

- Have local government work in a public-private partnership with the private sector to build **open access networks** that remove the capital cost deterrent from expanding infrastructure
- Since the open access network would be available to all service providers, there is a level playing field
- Put on place a network governance plan that ensures non-discriminatory practices and fees
- Outsource the operation of the network to a neutral third party with the technical know-how to manage the open access network
- While first generation networks, such as those offering DSL and cable modem meet many needs today, it is felt communities and service providers need to look ahead at building next generation networks capable of providing 10-100 Mbps bandwidth for larger demand applications and the ability for adequate competition in all three areas of voice, video and data services

Thank you for your attention and Interest!

Any Questions?

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